EPA, DTSC, and CDPH reviews of the Navy's Draft
Parcel C Radiological Data Evaluation Findings Report Draft
Hunters Point Naval Shipyard, San Francisco, California

Table of Contents
Below is an explanation of the contents of the individual spreadsheets in this workbook

EPA detailed review of Parcel C Trench Units
Fill units that received soil from trench units recommended for resampling
Summary of number of survey units recommended for resampling for trench, fill, and North Pier
Summary of recommendations for individual trench units

EPA reviews of Parcel C Trench Units that the Navy did not already recommend for resampling or reanalysis of archive
Trench Unit
TU193
TU199
TU200
TU205
TU206

d samples in the October 2017 draft Radiological Data Evaluation Findings Report		
Overall score (0,1, or 2)	Box Plots	Q-Q Plots
2	1) Data Evaluation form did not include graphs for Cs-137; however box plot generated by EPA/City of San Francisco show Cs-137 results all low, with multiple negative results - indicating a data quality issue 2) Bi-214 data has low variability	1) Ac-228 and K-40 have elevated results/evidence of different populations
2	1) Significant variability in characterization, bias and FSS results for all radionuclides, especially Ac-228, Bi-214	Slope breaks on Bi-214 and K-40 plots indicate multiple populations.
2	1) Cs-137 results all low, with multiple negative results - indicating a data quality issue 2) Ac-228 and K-40 FSS results have large variability, but Bi-214 has very low variability	K-40 FSS has a different slope than other radionuclides FSS (includes negative values) and slope breaks indicating multiple populations
2	1) Cs-137 results all low, with multiple negative results - indicating a data quality issue 2) K-40 FSS results have large variability. 3) Bi-214 FSS results have extremely low variability	1) K-40 FSS has a different slope than other radionuclides FSS (includes negative values). 2) Ac-228, B-214, and K-40 plots have slope breaks indicating multiple populations
2	1) Cs-137 results all low, with multiple negative results - indicating a data quality issue 2) K-40 and Bi-214 have extremely low variability and mean 3) Ac-228 and Bi-214 had some negative values	1) FSS K-40 results indicate at least two populations 2) Ac-228 and Bi-214 FSS data set included some negative results

Rounds of excavation	Gamma scan or static concerns
1	1) Gamma static and scan results are not consistent; static data (4315-4546 cpm) is less variable and inconsistent with scan data (2890-7730 cpm)
2	1) Gamma static data had low variability (4,690-4,920 cpm) and was not consistent with scan data (2,940-7,210 cpm).
1	1) Gamma static data had low variability (5012-5630 cpm) and was not consistent with scan data (3540-7920 cpm).
1	1) Gamma static survey date and time not provided in the SUPR 2) Scan data (2290-7660 cpm) is not consistent with static data (4206-4557 cpm); Scan range low values are below MDC for gamma detection.
1	1) Gamma static survey date and time not provided in the SUPR 2) Scan data (3210-7800 cpm) is not consistent with static data (4206-4557 cpm).

On vs offsite lab	Time Series	Suspect name (1=yes, 0=no)	Name, if suspect
Consistent	1) Characterization results were highly variable for Ac-228 and Bi-214 but FSS results were not variable even though no additional excavation was performed at these trenches.	1	J. Cunningham
Data is consistent with the exception of sample 25 where Bi-214 and K-40 were reported as low values by on-site lab, but at much higher levels at off-site lab.	1) Variability noted in bias, characterization and FSS results for all rads.	1	R. Roberson
Consistent	1) Large variability in Ac-228 but low variability in Bi-214 FSS results	1	J. Cunningham
Consistent except Ac-228 (0.011 v 0.11 pCi/g) and Bi-214 (0.0042 v 0.21 pCi/g onsite v offsite results in sample 18.	1 Bi-214, Ac-228, and K-40 FSS results for Sample 18 low compared to the rest of Parcel C and Ac-228 result for Sample 17 low compared to the rest of Parcel C.	1	R. Roberson
Consistent with the exception of ND values for Ac-228 and Bi-214	1) Bi-214 in sample 9 and Ac-228 in sample 3 appear low compared to Parcel C data; K-40 in samples 7 and 10 appear high compared to other results for TU206	1	R. Roberson

Name, if not suspect	Signs of falsifying (1=Yes, 0=no)	Signs of falsification summary	Failure to follow workplan (1=Y, 0=N)
N/A	1	1) Characterization results were highly variable for Ac-228 and Bi-214 but FSS results were not variable even though no excavation was performed at these trenches. 2) K-40 had highly elevated results for K-40 in two samples in the FSS despite the fact that the ROCs in these same two samples did not vary and were consistent with all other samples. 3) Q-Q Plots for FSS results for K-40 depict at least two different data populations	1
N/A	1	1) Bi-214 (0.023 pCi/g) and K-40 (0.51 pCi/g) were reported at levels much lower in on-site lab than reported in off-site lab. 2) K-S test outliers for Pb-212 3) Gamma static data had extremely low variability (230 cpm), suggesting data was collected in one place	0
N/A	1	1) FSS-Bias samples 22 and 23 were counted greater than 30 days after sample collection.	1
N/A	1	1) Ac-228 and Bi-214 FSS results low compared to rest of Parcel C. 2) K-S flags on data for Ac-228, Pb-212, Pb-214, Ra-226 3) Large discrepancy in reported results form on-site v. off-site lab for sample 18 for Ac-228 and Bi-214	1
N/A	1	1) ND outliers for Ac-228 and Bi-214, and high outliers for K-40 in FSS results.	1

Signs of failure to follow workplan
1) Gamma static and scan date and time were not provided in the SUPR
1) Gamma static and scan date and time were not provided in the SUPR
1) Gamma static and scan time and date were not provided in the SUPR 2) Sampler is not listed in the SUPR
1) Gamma static survey date and time not provided in SUPR 2) Sampler is not listed in the SUPR
1) Gamma static survey date and time not provided in SUPR 2) Sampler is not listed in the SUPR

Comments - Other
1) TU contained sewer line that was connected to or downstream from radiologically impacted Building 241 2) No confirmatory bias samples collected during FSS 3) Resampling recommended due to inconsistent gamma static survey, low variability B-214 data and evidence of multiple populations.
Resample due to extremely low variability gamma static data that was inconsistent with the gamma scan data and the FSS dataset, and evidence for multiple populations in K-40 and Bi-214 data sets.
1) Significant data quality problems, indicated by the following: Multiple Cs-137 results at or below 0 2) TU contained sewer line that was connected to or downstream from radiologically impacted Building 140 3) Cs-137 detected in manhole sediment at 0.6539 pCi/g and Ra-226 in the same sample at 1.64 pCi/g. 4) Resample due to low variability gamma scan data, low variability Bi-214 data, and evidence of multiple populations.
1) Data Eval Form states that the FSS results reported a lower average activity than the rest of Parcel C, and TU205 is located in the area surrounding Drydock #4 and is consistent with the results reported for other trenches in this area of Parcel D. The Data Eval Form also states that the K-S test flags were likely caused by low NORM activities in the area around Drydock #4. 2) Resample due to low variability and inconsistent gamma scan data, extremely low variability Bi-214 data, and evidence of multiple populations.
1) Data Eval Form states that the FSS results reported a lower average activity than the rest of Parcel C, and TU206 is located in the area surrounding Drydock #4 and is consistent with the results reported for other trenches in this area of Parcel D. The Data Eval Form also states that the K-S test flags were likely caused by low NORM activities in the area around Drydock #4. 2) Resample due to low variability and inconsistent gamma scan data, low variability Bi-214 and K-40 data, and evidence of multiple populations.

Followup needed, e.g. questions for Navy
1) Navy should provide evidence that soils near drydock #4 contain NORM. Additionally it is requested that the Navy explain how the presence of NORM would cause Ac-228 and Bi-214 to be highly variable and low or ND.
1) Navy should provide evidence that soils near drydock #4 contain NORM. Additionally it is requested that the Navy explain how the presence of NORM would cause Ac-228 and Bi-214 to be highly variable and low or ND.

TU207
TU208
TU209
TU211
TU212
TU219

2	1) Cs-137 results all low, with multiple negative results - indicating a data quality issue 2) K-40 FSS results have large variability. 3) Ac-228 and Bi-214 had some negative values and Bi-214 has low variability	1) FSS K-40 results indicate at least two populations and large variability 2) Ac-228 and Bi-214 FSS data set included some negative results, but also have slope breaks indicating multiple populations. Form notes, "Slight bend in Bi-214 and Ac-228 Normal Quantile plots indicates potential for multiple distributions."
2	1) Cs-137 results all low, with multiple negative results - indicating a data quality issue 2) K-40 FSS results have large variability. 3) Ac-228 and Bi-214 had some negative values	1) FSS K-40 results indicate at least two populations and large variability 2) Ac-228 and Bi-214 FSS data set included some negative results and indicate potential multiple distributions of data.
2	1) Ac-228 and Bi-214 plots show average concentrations lower than most of Parcel C; Ac-228 have lower variability compared to most of Parcel C. Bi-214 has extremely low variability. 2) K-40 results large range of values 3) Cs-137 results all ND or negative results	1) Plots indicate two different populations for Ac-228, K-40, and Bi-214 2) Ac-228 data set includes some negative values
2	1) K-40 results large range of values	1) Slope breaks in Ac-228 and K-40 indicate multiple populations
0	1) K-40 results large range of values 2) Very low variability Bi-214 results	1) K-40 results large range of values and plot has slope breaks indicating multiple populations
2	1) Ac-228 and Bi-214 show average activity is lower for FSS compared with the bias samples. 2) K-40 FSS results have low range of values	1) Ac-228, Bi-214, and K-40 plots have slope breaks indicating multiple populations

1	1) Gamma static survey date and time not provided in the SUPR 2) Scan data (3160-7780 cpm) is not consistent with static data (4972-5265 cpm).
1	1) Gamma static survey date and time not provided in the SUPR 2) Scan data (3290-7510 cpm) is not consistent with static data (5624-6638 cpm).
1	
1	1) Scan data (2940-7580) inconsistent with static data (5332-6025, low variability in static data; Low values of gamma scan data appear to be below the Minimum Detectable Activity (MDA).
1	
2	1) Scan (3820-6580 cpm) and Static measurements (5762-6259) are not consistent.

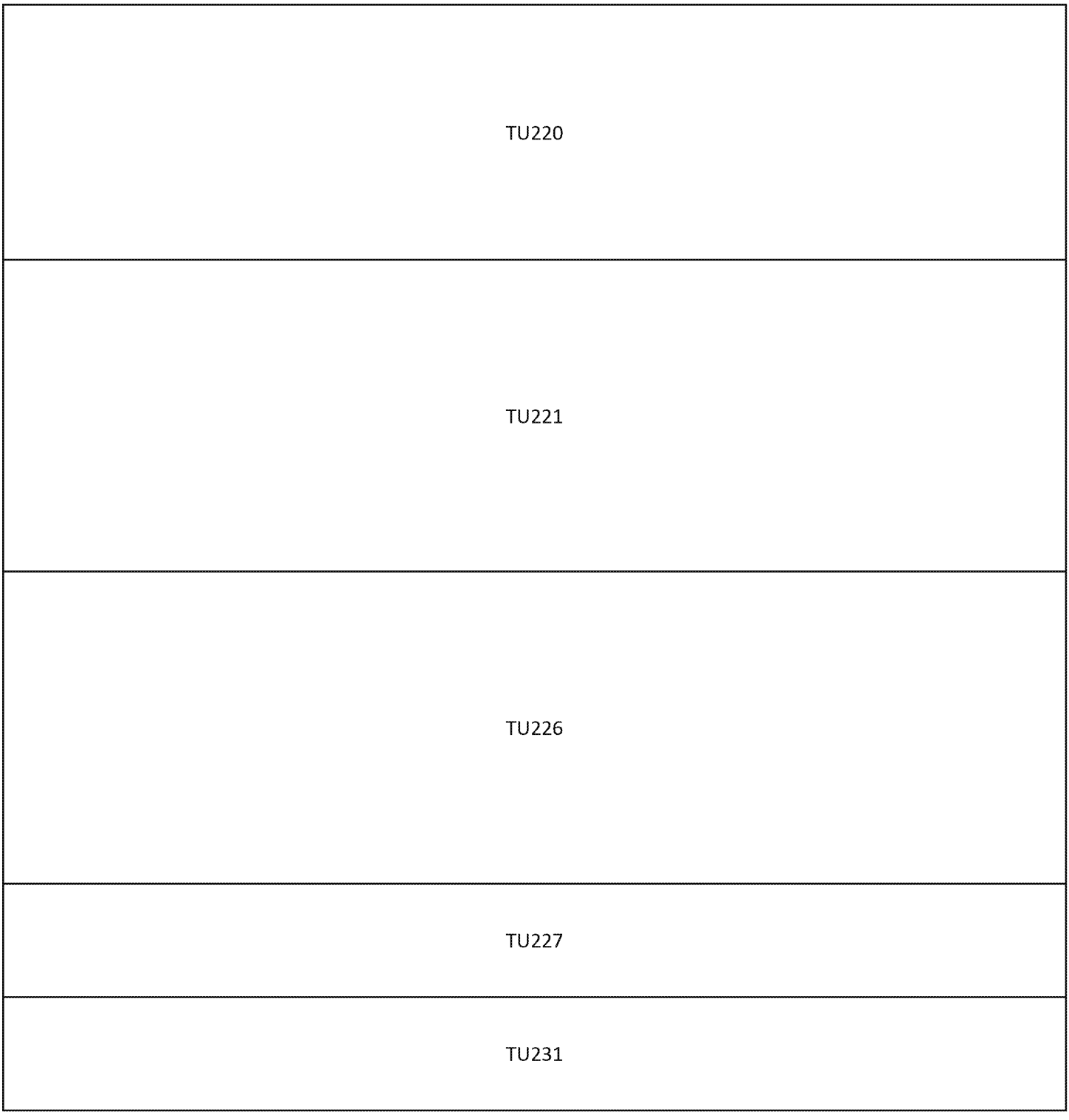
1) Data is inconsistent; variation noted in Ac-228 and Bi-214 being generally higher with offsite lab. Data Eval Form states this is likely due to onsite lab methods used for estimation; K-40 results consistent. 2) Some ND values for Ac-228 and Bi-214	1) Bi-214 in sample 4 and Ac-228 in samples 4 and 7 reported activities near or below zero.	1	R. Roberson
1) Generally consistent except for Ac-228 in samples 2 and 15 which had low results in the onsite lab but not in the offsite lab; and Bi-214 which was reported low in the onsite lab results but not in the offsite lab results.	1) Bi-214and Ac-228 reported near or below zero in 3 samples.	1	J. Cunningham
1) Mostly consistent: sample 4 Ac-228 reported as ND by onsite lab and as 0.141 pCi/g by ofsite lab. Sample 17 Bi-214 reported as 0.0398 pCi/g by onsite lab and 0.313 pCi/g by offsite lab.	1) Low values for Ac-228 and Bi-214 reported compared to most of Parcel C.. The K-40 data range large: from 1.03 through 18.74 pCi/g.	1	A. Smith
Consistent		1	A. Smith
Consistent	None	1	J. Cunningham
Consistent	1) 1 Bi-214 result, 3 Ac-228, 1 K-40 result, and all Cs-137 results reported as ND. 2) Ac-228 and Bi-214 show average activity is lower for FSS compared with the bias samples.	1	J. Cunningham

N/A	1	1) ND outliers and high outliers for Ac-228 and Bi-214, and highly variable results, potentially multiple populations for Ac-228 and Bi-214 FSS results.	1
N/A	1	1) ND outliers and high outliers for Ac-228 and Bi-214, and highly variable results, potentially multiple populations for Ac-228 and Bi-214 FSS results. 2) Low variability gamma statics that are not consistent with the gamma scan survey	1
N/A	1	1) ND outliers and large variability/potential multiple populations for Ac-228, Bi-214, K-40 FSS results. 2) K-S test outliers for Bi-214, Pb-212, Pb-214.	1
N/A	1	1) ND outliers and large variability/potential multiple populations for Ac-228, K-40 FSS results.	1
N/A	0		1
N/A	1	1) Ac-228, Bi-214 results have a lower average activity than other samples from Parcel C. 2) K-40 results lower and more variable than most of the data reported for Parcel C. 3) Low variability and inconsistent gamma static survey.	1

1) Gamma static survey date and time not provided in SUPR
1) No gamma static date or time in SUPR 2) Sampler is not listed in the SUPR
1) Sampler is not listed in the SUPR.
1) Sampler is not listed in the SUPR
1) Sampler is not listed in the SUPR
1) Sampler is not listed in the SUPR

1) Data Eval Form states that the FSS results reported a lower average activity than the rest of parcel C, and TU207 is located in the area surrounding Drydock #4 and is consistent with the results reported for other trenches in this area of Parcel D. 2) FSS samples 4 and 7 reported lower results than the rest of TU207 based on the onsite lab results but offsite lab results were consistent. 3) Resample due to low variability and inconsistent gamma scan data, low variability Bi-214 data, and evidence of multiple populations.
1) No confirmatory/biased samples collected for FSS 2) Data Eval Form states that the FSS results reported a lower average activity than the rest of parcel C, and TU207 is located in the area surrounding Drydock #4 and is consistent with the results reported for other trenches in this area of Parcel D. 3) Resample due to low variability and inconsistent gamma static data and evidence of multiple populations.
1) Resample due to extremely low variability Bi-214 samples, evidence of multiple populations, K-S test results, and data quality issues. 2) Data Eval Form states that the FSS results reported a lower average activity than the rest of Parcel C, and TU209 is located in the area surrounding Drydock #4 and is consistent with the results reported for other trenches in this area of Parcel D.
1) The sewer line was connected to radiologically-impacted Building 241. 2) Resample due to low variability and inconsistent gamma scan data, evidence of multiple populations.
1) The sewer line was connected to radiologically-impacted Building 241.
1) Analytical results for manhole sediment indicated activity above the release criterion for Cs-137 at 0.2445 pCi/g. 2) K-40 results lower and more variable than most of the data reported for Parcel C but FSS results consistent with bias samples for FSS. 3) Form indicates TU 219 has a single population, but there are slope breaks on the Bi-214, Ac-228, and K-40 QQ plots indicating multiple populations 4) Resample due to low variability and inconsistent gamma static data, low variability K-40 data, and evidence of multiple populations.

1) Navy should provide evidence that soils near drydock #4 contain NORM. Additionally it is requested that the Navy explain how the presence of NORM would cause Ac-228 and Bi-214 to be highly variable and low or ND.
1) Navy should provide evidence that soils near drydock #4 contain NORM. Additionally it is requested that the Navy explain how the presence of NORM would cause Ac-228 and Bi-214 to be highly variable and low or ND.
1) Navy should provide evidence that soils near drydock #4 contain NORM. Additionally it is requested that the Navy explain how the presence of NORM would cause Ac-228 and Bi-214 to be highly variable and low or ND.


TU220
TU221
TU226
TU227
TU231

2	1) Several Bi-214, Ac-228, K-40 FSS results, and all Cs-137 results reported as negative/ND. 2) K-40 FSS results very small range of values and Bi-214 FSS results have extremely low variability and range of values	1) 1 Bi-214 result, 3 Ac-228, 1 K-40 result, and all Cs-137 results reported as ND. 2) K-40 results lower activities, and slope breaks indicate multiple populations
2	1) Ac-228 bias results lower variability compared to FSS results; Bi-214 bias results have higher variability compared to FSS results. 2) K-40 FSS results large range of values and greater than bias results, but Bi-214 FSS results have lower variability	1) Ac-228 and K-40 plots have slope breaks indicating multiple populations 2) All Cs-137 results negative/ND.
2	1) Bi-214 FSS results have low variability	1) Ac-228, Bi-214, and K-40 have slope breaks, may indicate more than one population. 2) Cs-137 results all low, with multiple negative results - indicating a data quality issue
2	1) Bi-214 and K-40 results have extremely low variability	1) Bi-214 and K-40 plots have slope breaks indicating multiple populations
2	1) Bi-214 and K-40 data have low variability	1) Ac-228, Bi-214, and K-40 plots have slope breaks indicating multiple populations.

1	1) Scan (3500-7900 cpm) and Static measurements (4031-5036) are not consistent.
1	1) Scan (4920-7970 cpm) and Static measurements (4145-4672) are not consistent.
1	1) Date and time of static survey not provided in SUPR. 2) Scan data (3220-7840 cpm) is not consistent with static data (5017-5601 cpm).
1	1) Scan data collection started concurrently with FSS sample collection. 2) Scan data (5870-7890 cpm) are not consistent with static data (5897-5320 cpm).
1	1) Scan data collection started concurrently with FSS sample collection. 2) Scan data (3940-7810 cpm) are not consistent with static data (4926-5792 cpm).

1) Average Ra-226 values reported by onsite lab are higher than those reported by offsite lab, however the difference in mean values is not statistically significant.	1) 1 Bi-214 result, 3 Ac-228, 1 K-40 result, and all Cs-137 results reported as ND. 2) K-40 results lower activities, and large range of values, may represent more than one population.	1	J. Cunningham
Consistent	None.	1	J. Cunningham
Consistent	1) Form notes for Bi-214, "Samples 06 and 07 are low compared to other results from TU226." Form notes for Ac-228, " The Final Systematic data indicate at least two different distributions" 2) Cs-137 results all low, with multiple negative results - indicating a data quality issue	1	R. Roberson
Form notes, "Data is consistent, except for sample 16. Onsite K-40 activity is 12.29 pCi/g and offsite activity is -0.199 pCi/g."	1) Form notes for K-40, "Final Systematic samples display less variability than most samples in Parcel C."	1	A. Smith
Consistent	None	1	J. Cunningham

N/A	1	1) Ac-228, Bi-214, K-40 have negative/ND results, all Cs-137 results negative/ND. 2) Data Eval Form for TU221 notes that the average activities for TU220 are half what is reported for adjacent TU221. 3) K-40 results lower and more variable than most of the data reported for Parcel C; K-S test failed for 3 K-40 results. 4) Gamma statics had low variability and were inconsistent with the gamma scan data.	1
N/A	1	1) Gamma static measurements had low variability and were inconsistent with the gamma scan and soil sample results. 2) Ac-228 bias results lower variability compared to FSS results; Bi-214 bias results have higher variability compared to FSS results, which have very low variability, and all Cs-137 results negative/ND. 3) K-40 results variable and may represent more than one population. 5) K-S test failed for 1 Pb-212 and 1 Pb-214 for the units eval and the days evaluation.	1
N/A	1	1) Bi-214 has low variability, slope breaks on Ac-228, Bi-214, and K-40 QQ plots may indicate more than one population. 2) Low variability and inconsistent gamma static survey	1
N/A	1	1) Gamma static survey had low variability and was inconsistent with gamma scan data	1
N/A	1	1) Gamma static survey had low variability and was inconsistent with gamma scan data	1

1) Sampler is not listed in the SUPR
1) Sampler is not listed in the SUPR
1) Sampler is not listed in the SUPR 2) Samples counted more than 2 weeks after collection (15 and 16 days later), but may be due to backup in onsite lab
1) Names of samplers/surveyors not provided in SUPR.
1) Names of samplers/surveyors not provided in SUPR.

1) Resample due to extremely low variability Bi-214 samples, low range for K-40 FSS samples that were inconsistent with the rest of Parcel C, low variability and inconsistent gamma statics, and evidence of multiple populations.
1) Analytical results from manhole sediment indicated activity above the release criterion for Cs-137 at 0.364 pCi/g, resulting in collection of bias samples from the bottom of the trench 2) Resample due to low variability and inconsistent gamma statics, low variability Bi-214 FSS samples, and evidence of multiple populations
1) The TU226 sewer line is connected to/downstream of radiologically impacted Building 272. 2) Average Ac-228 results in TU226 (0.48 pCi/g) is lower than the average activity in ES442 (0.65 pCi/g). 3) Resample due to low variability and inconsistent gamma static survey, low variability Bi-214 data, evidence of multiple populations
1) Resample due to low variability and inconsistent gamma static survey, extremely low variability Bi-214 and K-40 FSS data, and evidence of multiple populations
1) Resample due to low variability and inconsistent gamma static survey, low variability Bi-214 and K-40 FSS data, and evidence of multiple populations

What information exists that demonstrates the onsite laboratory had a backlog of samples at the time the September 2012 FSS samples were collected?

TU232
TU233
TU236
TU244
TU247

2	1) Bi-214 data have low variability. 2) K-40 FSS results large range of values	1) Ac-228, Bi-214, and K-40 plots have slope breaks indicating multiple populations.
2	1) Several Bi-214 and Ac-228 results, and all Cs-137 results reported as negative/ND. 2) Bi-214 FSS data have low variability, but K-40 FSS data have high variability	1) Ac-228, Bi-214, and K-40 plots have slope breaks indicating multiple populations. 2) Plots indicate all Cs-137 FSS results ND, however Cs-137 was detected above the release criteria prior to FSS therefore it would be expected that even after remediation, some Cs-137 below release levels would be present.
2	Very low variability Bi-214.	Slope breaks in Ac-228 and K-40 plots indicate multiple populations. Form notes, "K-40 Normal Quantile plot for K-40 shows higher median activity for Bias samples compared with Final Systematic samples."
0		Slope breaks in Ac-228 and K-40, and probably in B-214 plots indicate multiple populations. Form notes, "Ac-228 quantile plot shows a bend, indicating multiple distributions."
2	Low variability Bi-214. Form notes, "Sample variance is low for Bi-214, K-40 average is higher than the rest of Parcel C."	Slope breaks on Bi-214 and K-40 plots.

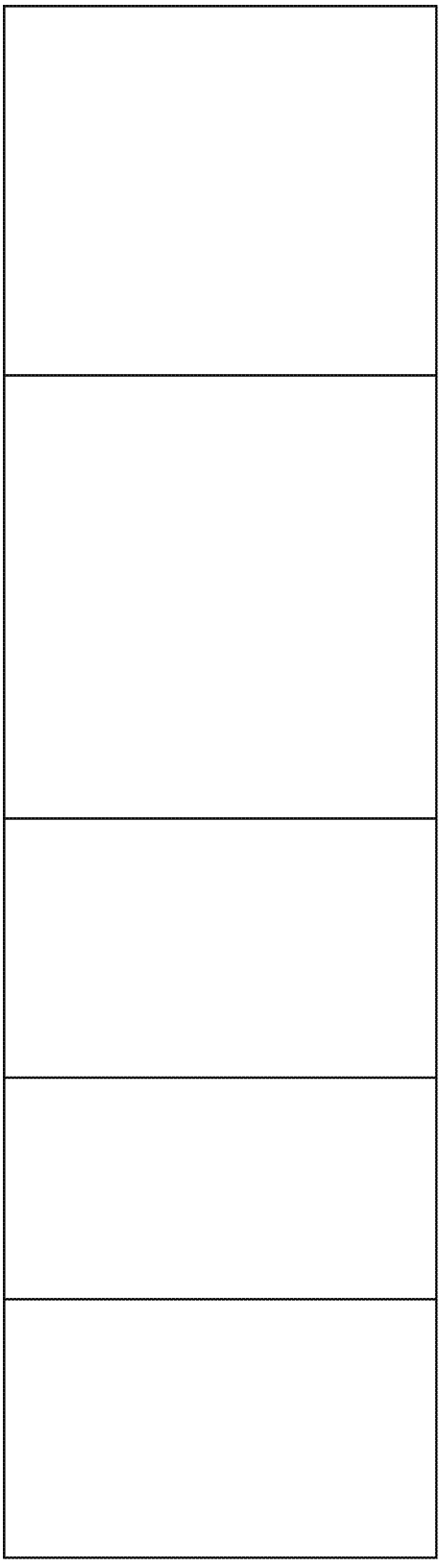
1	1) Date and time of static survey not provided in SUPR. 2) Scan data (3940-7810 cpm) is not consistent with static data (4926-5792 cpm). 3) Gamma scan performed before FSS samples were collected, suggesting potential that samples were biased to areas where contamination was unlikely.
1	1) Date and time of static survey not provided in SUPR. 2) Scan data (3510-7560 cpm) is not consistent with static data (5017-5557 cpm).
1	1. Form notes for gamma statics, "Gamma static dataset has low variability compared with gamma scan dataset with a range of 5156-5497 cpm. Gamma static dataset is inconsistent with gamma scan dataset and soil samples results." 2. Form notes for gamma scan, "Gamma scan dataset is inconsistent with scan data with a range of 3660-8028 cpm."
1	No gamma static date or time in SUPR.
1	1. Form notes for gamma statics, "The static measurements reported low variability. Gamma static dataset inconsistent with the gamma scan dataset and Final Systematic sample dataset." 2. Form notes for gamma scan, "Gamma scan dataset consistent with Final Systematic sample dataset and inconsistent with the gamma static dataset."

Consistent	1) Form notes for Bi-214 and Ac-228, "Final Systematic samples indicate the potential for at least two different data populations." 2) Form notes for K-40, "Unusual sequence of descending results for samples 7 to 17."	1	J. Cunningham
Consistent	1) Several Bi-214, Ac-228, K-40 FSS results, and all Cs-137 results reported as negative/ND.	1	R. Roberson
	Form notes for Bi-214, Ac-228, and K-40, "Final Systematic samples display different characteristics from Bias samples."	1	R. Roberson
	Form notes for Bi-214, Ac-228, and K-40, "Final Systematic samples indicate the potential for at least two different data populations."	1	R. Roberson
Form notes, "The onsite and offsite labs generally agree."		1	J. Cunningham

N/A	1	1) Scan survey started concurrently with the time of collection of FSS sample 1. 2) Low variability and inconsistent gamma static survey data.	1
N/A	1	1) Low variability and inconsistent gamma static survey.	1
	1	1. FSS samples have different characteristics than the bias samples (which were collected because Cs-137 was detected in a manhole). 2. Low variability gamma static data that is inconsistent with the gamma scan data. 3. Low variability Bi-214 data	1
	1	Multiple populations in Bi-214, Ac-228, and K-40 may indicate falsification.	1
	1	1. Gamma statics inconsistent with gamma scan and FSS samples.	1

1) Names of samplers/surveyors not provided in SUPR.
1) No COC present in SUPR. 2) Date and time of static survey not provided in SUPR. 3) Name of samplers/surveyors not provided in SUPR.
No surveyor/sampler name in SUPR.
No surveyor/sampler name in SUPR and no gamma static date or time in SUPR.
No date or time recorded for static survey in SUPR and no sampler/surveyor name in SUPR.

1) Analytical results for manhole sediment identifiedRa-226 activity above the release criterion at 2.47 pCi/g, resulting in collection of bias samples from the trench bottom. 2) Resample due to low variability and inconsistent gamma static survey, conducting gamma scan survey before FSS sample collection, sequential K-40 data, low variability Bi-214 data, and evidence of multiple populations
1) Biased samples collected on 11/11/2011; systematic samples collected two months later, on 01/18/2012. 2) Analytical results from manhole sediment showed Cs-137 activity above the release criterion in two of the samples at 0.161 and 0.282 pCi/g. A sediment sample was collected from pipe excavated in association with trench segment 02-C33-29-1R; analytical results indicated Cs-137 activity above the release criterion at 2.807 pCi/g. 3) Resample due to low variability and inconsistent gamma scan data, low variability Bi-214 data, and evidence of multiple populations.
Resample due to FSS samples with different characteristics than bias samples and multiple populations; low variability gamma static data that is inconsistent with the gamma scan data, and low variability in Bi-214 data.
1. Form also observes "TU247 had a significantly high mean for K-40 when compared to rest of Parcel C and had a p-value of 2.61-e11" and that "evidence of potential data falsification was identified in the gamma static measurements." 2. Resample due to inconsistent gamma statics, low variability B-214, and slope breaks and high mean K-40, potentially indicating a different source for some samples.



TU302
TU315
TU317
TU320
TU321

2	Characterization samples for Ac-228, Bi-214, K-40) are a different population (lower mean, lower variability) than FSS samples, while the Cs-137 characterization samples have a slightly lower mean and greater variability than the FSS samples. Form notes, "Characterization datasets show lower average and lower variability compared to Final Systematic data."	Characterization samples for Ac-228, B-214, and K-40 have a different slope than the FSS samples, suggesting a different source of soil. K-40 FSS plot has slope breaks indicating multiple populations. Form notes, "Characterization plots are closer to horizontal with lower average activities compared with Final Systematic results."
2	Low variability Bi-214 and K-40	Slope breaks in Ac-228, Bi-214, K-40 indicate multiple populations. Form notes, "Quantile plots are bimodal suggesting two different sample populations."
2	Very low variability Bi-214 and K-40. Bias samples for Ac-228, B-214, and K-40 have lower variability and means than FSS samples. Form notes, "Distributions for Bias samples have low variability compared to Final Systematic samples."	Slope breaks in Ac-228, Bi-214, K-40 indicate multiple populations. Bias sample plots also have slope breaks, indicating multiple populations.
2	Extremely low variability Bi-214 data and low variability K-40.	Slope breaks in K-40 and probably B-214 plot (hard to tell due to low variability) indicate multiple populations.
2	Low variability Bi-214 data	Slope breaks on Bi-214 and K-40 plots indicate multiple populations.

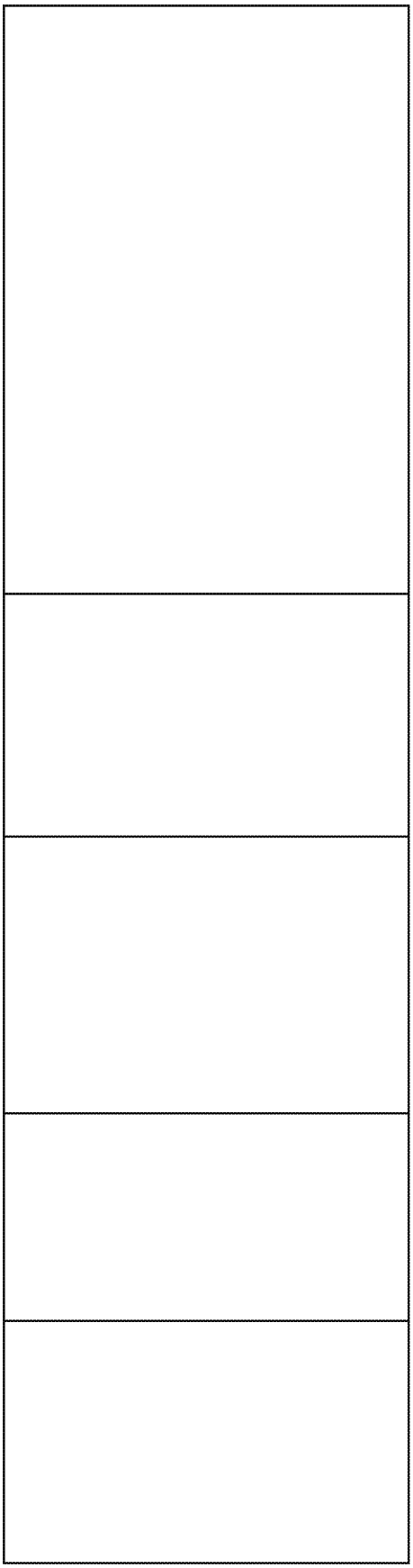
2	Form notes for gamma statics, "Gamma static results have low variability with an average at the upper bound of the range of gamma scan results. The Gamma static data set is inconsistent with the gamma scan dataset and Final Systematic sample dataset." Form notes about gamma scan, "Scan results ranged from 2,770 to 5,980 cpm, with a 3-sigma investigation level of 7,638 cpm. This is consistent with the Characterization soil samples with low results that were rejected. The gamma scan dataset is inconsistent with the gamma static dataset and the Final Systematic sample dataset."
1	Form notes for gamma statics, "Gamma static dataset inconsistent with scan dataset and FSS sample dataset." Form notes for gamma scan, "Gamma scan dataset inconsistent with static data and consistent with FSS sample dataset." Also, form notes, "evidence of potential data falsification was identified in the gamma static measurements."
1	Form notes for gamma statics, "The minimum gamma static results are less than the minimum gamma scan results, and show less variability. The gamma static dataset is inconsistent with the gamma scan dataset and the FSS sample dataset." Form notes for gamma scan, "Gamma scan dataset is inconsistent with static data and consistent with FSS sample dataset." Form also notes there is "evidence of potential data falsification was identified in the gamma static measurements"
1	Form notes for gamma statics, "Gamma static dataset is inconsistent scan data and Final Systematic sample dataset." Form notes for gamma scan, "Gamma scan dataset is inconsistent static data and Final Systematic sample dataset."
1	Form notes for gamma statics, "Gamma static dataset is inconsistent with scan data and Final Systematic sample dataset." Form notes for gamma scan, "Gamma scan dataset is inconsistent with static data and consistent with Final Systematic sample dataset."

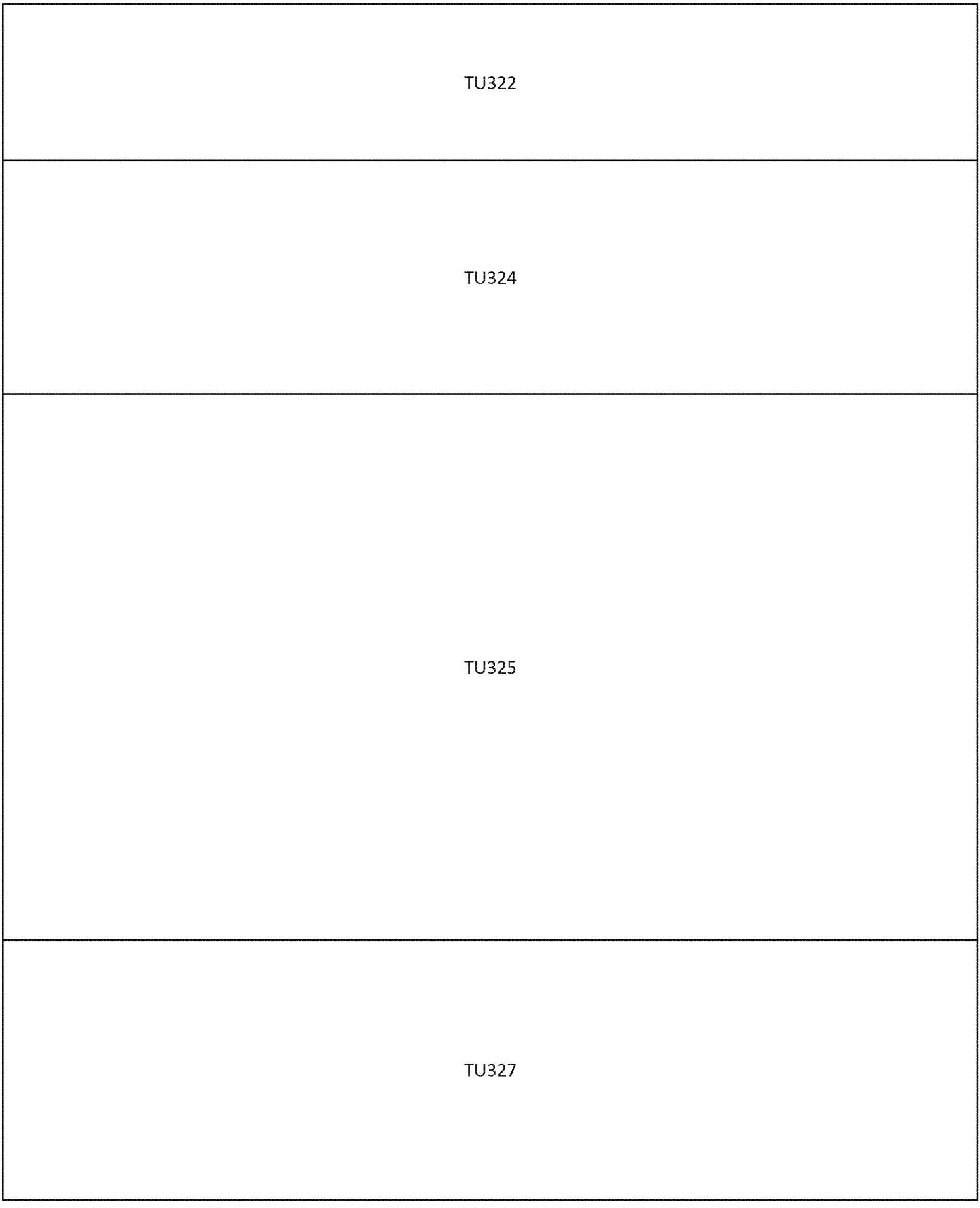
	Form notes for Bi-214 and Ac-228, "Final Systematic samples 34 and 38 have relatively low activity. Characterization samples display different characteristics from Bias and Final Systematic samples" Form notes for K-40, "Characterization samples display different characteristics from Bias and Final Systematic samples."	1	R. Roberson and J. Cunningham
Form notes, "There was some discrepancy between the Pb-212 results, but otherwise sample results were consistent between the two laboratories."	Form notes for B-214, "Samples 08, 10, 14, 15 and 16 had low activities compared with most of Parcel C." Form notes for Ac-228, "Samples 04, 05, 06, 08, 14, 16 and 18 had low activities compared to most of Parcel C."	1	R. Zahensky
	Form notes for Bi-214 and Ac-228, "Samples 23 and 30 are unusually low."	0	
Form notes, "Onsite and Offsite laboratory generally agree."	For notes for Bi-214 and Ac-228, "Notes: Samples 2, 15 and 16 had low concentrations compared with the rest of TU320."	2	
Form notes, "Onsite and Offsite laboratory generally agree."	Form notes for Bi-214, "Samples 3 and 9 reported results lower than the rest of TU321." Form notes for Ac-228, "Samples 2, 3, and 9 reported results lower than the rest of TU321."	0	

	1	1. FSS Samples counted over 5 days, 19 months after final bias/characterization samples counted. 2. Inconsistent gamma statics and gamma scan (neither is consistent with each other or with the post-reexcavation FSS samples. 3. Evidence of different populations in FSS and bias/characterization samples.	1
	1	1. One sample, 09, was analyzed on 3/1 while the other was analyzed 2/26 or 2/27, suggesting the potential that sample 09 was substituted. 2. Form notes, "evidence of potential data falsification was identified in the gamma static measurements."	1
M. Arnerich	1	Form notes "evidence of potential data falsification was identified in the gamma static measurements."	1
C. Hughes	1	Form notes "evidence of potential data falsification was identified in the gamma static measurements."	1
M. Arnerich	1	Form notes "evidence of potential data falsification was identified in the gamma static measurements."	1

FSS samples counted over 5 days. No gamma statics date or time.
No date or time recorded for static survey in SUPR and no sampler/surveyor name in SUPR.
No date or time recorded for static survey in SUPR and no sampler/surveyor name in SUPR.
No date or time recorded for static survey in SUPR and no sampler/surveyor name in SUPR.
No date or time recorded for static survey in SUPR and no sampler/surveyor name in SUPR.

1. FSS samples counted over 5 days. Final bias/characterization samples counted 19 months earlier (May 2012, compared to FSS counting in Dec 2013, possibly due to identification of this in the Anomalous Soil Samples Report). However, even though the anomalous data was replaced, there are still inconsistencies indicative of potential falsification. 2. Form notes that Cs-137 was detected in pipe sediment at 0.4746 pCi/g resulting in 4 bias samples from the bottom of the trench. Given the differences between the bias/characterization samples and the FSS samples, it is apparent that different sources were sampled. 3. Form notes in relation the first 18 FSS samples, "during review of the sampling data, the systematic samples were identified as having much lower radium-226 (Ra-226), bismuth-214 (Bi-214), lead-214, and potassium-40 activity than any of the previous samples collected from other trenches in Parcel C. These results appeared to suggest that these samples were not representative of this trench unit. " This data was not used and after re-excavating the trench, a second set of 18 FSS samples were collected and analyzed at an off-site lab. 4. Ra-226 above cleanup criterion identified/remediated in both fill units that came from this TU. 5. Recommend resampling due to inconsistent gamma statics and gamma scan, evidence of different population of characterization samples, including the bias samples from the bottom of the trench and overall uncertainty about the rework done in response to the anomalous K-40 data.
Resample due to low variability Bi-214 and K-40 data, inconsistent gamma statics, evidence of multiple populations, and probable substitution of a sample (09).
1. Biased samples collected due to Ra-226 in manhole sediment above release criterion. 2. Resample due to very low variability Bi-214, difference between bias and FSS samples, evidence of multiple populations, low variability and inconsistent gamma statics data.
1. Resample due to extremely low variability Bi-214 data, low variability K-40 data, inconsistency of gamma scan and gamma static surveys with each other and with the FSS samples. 2. K.S. Test flags for multiple radionuclides. Form notes, " Observations: TU320 ad a p-value of 3.05e-5 for Bi-214. TU320 had a significantly low mean result for Pb-214 compared to the rest of Parcel C, and a p-value of 6.2e-6. TU320 had a significantly low mean result for Ra-226 compared to the rest of Parcel C, and a p-value of 6.74e-6."
Resample due to low variability Bi-214, inconsistent gamma statics, and evidence of multiple populations.




TU322
TU324
TU325
TU327

2	Very low variability Bi-214 and K-40 data.	K-40 plot has slope breaks indicating multiple populations.
2	Very low variability Bi-214 and K-40 data.	Slope breaks in Ac-228, Bi-214, K-40 indicate multiple populations.
0	Form notes, "Ac-228 box plot shows high variability consistent with multiple distributions, Bi-214 shows a single high outlier (Sample 2)."	Slope breaks in Ac-228, Bi-214, K-40 indicate multiple populations. Form notes, "Ac-228 and Bi-214 plots both show a single high outlier (sample 2)."
0		Slope breaks in Ac-228, Bi-214, K-40 indicate multiple populations. Form notes, "Quantile plots are not linear so the data are not normally distributed."

1	Form notes for gamma statics, "Gamma static dataset is inconsistent with scan data and Final Systematic sample dataset." Form notes for gamma scan, "Gamma scan dataset is inconsistent with static data and consistent with Final Systematic sample dataset."
1	Form notes for gamma statics, "Gamma static results ranged from 3,030 to 6,235 cpm. The gamma static dataset is inconsistent with the gamma scan dataset and the Final Systematic sample dataset." Form notes for gamma scan, "Gamma scan results range from 4,300 to 7,590 cpm with a 3-sigma investigation level of 7,707 cpm. The gamma scan dataset is inconsistent with the gamma static dataset and the Final Systematic sample dataset."
1	The form notes that the gamma statics and gamma scan were consistent, but the maximum gamma scan was 11,200 cpm and the maximum gamma static measurement was 9,829 cpm, both allegedly from sample location 8. This does not appear to be consistent.
1	Gamma scan maximum was 19,000 cpm, which is attributed to engineered fill containing NORM.

Form notes, "Bi-212 doesn't compare very well between onsite and offsite results."		0	
	Odd that the Form notes that the Time Series Plots fail, but there are no notes that explain why.	0	
An additional sample was collected to replace Sample 2. This replacement (19) contained none of the engineered fill that was found below the pipe and that contained NORM.	Form notes for Bi-214 and Ac-228, "Final Systematic samples indicate the potential for at least two different data populations."	0	
Off-site lab results were higher for Ac-228, Bi-214, and K-40, but lower for Ra-226.	Form notes for Bi-214 and Ac-228, "3 Final Systematic samples reported results near zero."	0	

M. Arnerich	1	Form notes "evidence of potential data falsification was identified in the gamma static measurements."	1
M. Arnerich	1	1. Form notes "evidence of potential data falsification was identified in the gamma static measurements." 2. Sample 16 was the only sample counted on the second day, suggesting the potential for substitution.	1
I. Tapelu	0		1
I. Tapelu	0		1

No date or time recorded for static survey in SUPR and no sampler/surveyor name in SUPR.
No date or time recorded for static survey in SUPR and no sampler/surveyor name in SUPR.
1. No date or time recorded for static survey in SUPR and no sampler/surveyor name in SUPR. 2. FSS Samples collected on 2 different days, 3 weeks apart (all samples should have been collected on the same day or on consecutive days).
1. Form notes, "Confirmatory/bias samples were collected on 06/17/2013, 07/03/2013, 07/15/2013," which is after the FSS samples were collected. Form reports that this was to attempt to collect samples that did not contain engineered fill, which was demonstrated to have NORM. 2. No date or time recorded for static survey in SUPR and no sampler/surveyor name in SUPR.

1. Resample due to very low variability Bi-214 and K-40 data, evidence of multiple populations, manhole disposed as LLRW, and evidence of data falsification in gamma static survey. 2. Form notes, "Survey results for these manholes and pipe sections identified one manhole with elevated net (fixed and removable) beta/gamma static measurements recorded at 1,226 disintegrations per minute per 100 square centimeters (dpm/100 cm2). The manhole was disposed of as low-level radioactive waste."
Resample due to very low variability Bi-214 and K-40, evidence of multiple populations, inconsistent gamma static survey with gamma scan and FSS samples, and the fact that one sample was counted on a different day (possible substitution).
1. Multiple radionuclides flagged by K-S test. Form notes, "TU325 had a significantly high mean result for Bi-212 compared to the rest of Parcel C and had a p-value of 4.14e-5. TU325 had a p-value of 0.000126 for K-40. TU325 had a significantly high mean result for Pb-212 compared to the rest of Parcel C and had a p-value of 5.89e-5. TU325 had a significantly high mean result for Pb-214 compared to the rest of Parcel C and had a p-value of 9.32e-5. TU325 had a significantly high mean result for Ra-226 compared to the rest of Parcel C and had a p-value of 7.94e-5." 2. Form notes that "eight swipe samples (total) were collected from in situ pipe sections exiting Building 211. Survey results for these pipe sections identified elevated net (fixed and removable) beta/gamma measurements with maximum levels recorded as 3,002 disintegrations per minute [dpm] per 100 square centimeters [cm2]. The elevated open pipe pieces have been capped to prevent any possible contamination from entering TU325." 3. Form notes, "The confusing process of resampling, rejecting results, and replacing samples appears to be a technical attempt to deal with elevated levels of naturally occurring radionuclides in several samples. Since both Ac-228 and Ra-226 results are elevated in these samples, combined with the fact thorium series nuclides (e.g., Ac-228) are not radionuclides of concern (ROCs) at TU327, the elevated readings are evaluated to be naturally occurring. Any additional sampling or investigations in this area are likely to find similar levels of Ac-228 and Ra-226 activity in a limited number of samples when this material is encountered. TU325 consists of soils with multiple radionuclide distributions, with Ac-228 providing graphical evidence of at least two distributions. " 4. Resampling does not appear to be necessary, but the pipes in this TU did receive LLRW, based on the results of sampling the ends of the pipes.
1. Form notes, "Survey results for these manholes and pipe sections identified elevated net (fixed and removable) beta/gamma static measurements with a maximum level recorded at 1,660 disintegrations per minute (dpm) per 100 square centimeters (cm2). As a result, the pipe was disposed of as low-level radioactive waste (LLRW)." 2. Resampling does not appear to be necessary as elevated results and multiple populations appear to be due to the presence of engineered fill containing NORM in some samples.

Why does the entry for the Time Series Plot evaluation indicate "Fail," but there are no notes explaining why?

TU328
TU331
TU332

2	Bi-214 and K-40 data have low variability	Slope breaks in Ac-228 and K-40 plots indicate multiple populations.
2	Very low B-214 variability and extremely low K-40 variability	Slope breaks in Bi-214 and K-40 plots indicate multiple populations. Form notes, "Unusually small distribution of K-40 Final Systematic samples."
2	Low variability Bi-214 and K-40. Form notes, "Ac-228 and Bi-214 results have a large difference between median and mean, indicating a skewed distribution or outliers. Several outliers were plotted for both." However, this could also be evidence of multiple populations.	Slope breaks in Ac-228, Bi-214, K-40 indicate multiple populations. Form notes, "Ac-228 and Bi-214 plots show bends, indicating the potential for multiple distributions."

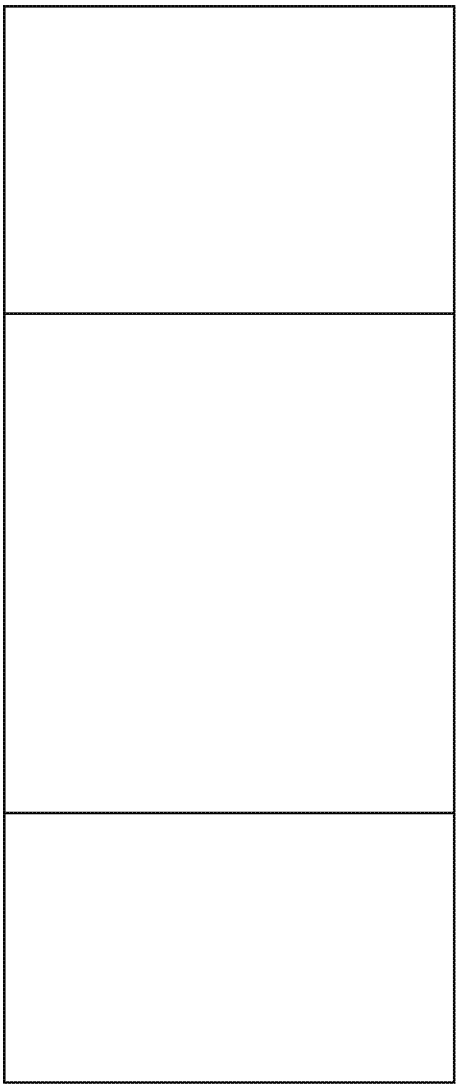
1	Form states that gamma statics and gamma scan are consistent, but the maximum gamma scan reading was 7,480 cpm, while the maximum gamma static measurement was 5,628 cpm. This does not appear to be consistent. Form notes in conclusions, "Final Systematic results reported a lower average activity than the rest of Parcel C." This was attributed to the location of this TU near Dry Dock 4.
1	
1	

Form notes, "Data is generally consistent. Onsite lab sample 2 and 4 Ac-228 results at -0.05717 and 0.03397 pCi/g, respectively. Offsite results at 0.3331 and 0.3481 pCi/g, respectively."	For Ac-228, form notes, "Final Systematic samples display characteristics of at least two different data populations. Final Systematic samples have result at or below 0." Form also notes, "Unusually low distribution of K-40 results."	0	
	Form notes for Ac-228, "Final Systematic samples indicate the potential for at least two different data populations. " For K-40, form notes, "Final Systematic samples have low variability with two high results."	0	
Form notes, "Onsite and offsite data generally agree."	Form notes for Bi-214 and Ac-228, "Final Systematic samples indicate the potential for at least two different data populations.."	0	

B. Willett	0	Gamma static maximum is significant lower than the maximum gamma scan.	1
B. Willett	1	Sample 8 was counted 5 days after other samples, suggesting sample was substituted.	1
B. Willett	1	Samples not counted within 2 days of collection; samples were counted 5 days later. However this was not flagged in the form.	1

Surveyor/sampler name not included in SUPR.
Static Survey date and time not included in SUPR.
Static Survey date and time not included in SUPR.

Resample due to uncertainty, gamma scan inconsistency (lower than gamma statics), low variability Bi-214 and K-40, and evidence of multiple populations. It is also unclear why proximity to Dry Dock 4 would impact sample results.
1. Form notes, "Survey results for this manhole and these pipe sections identified elevated net (fixed and removable) beta/gamma static measurements for the manhole with a maximum level recorded at 1,083 disintegrations per minute per 100 square centimeters. The manhole was disposed of as low-level radioactive waste." 2. K-S test failed for K-40. Form observes "Samples with low activity (3, 4, and 15) are geographically localized. TU330 had a p-value of 8.98e-7 for K-40." 3. Form notes in conclusions, "Although there is low variability associated with the distribution of K-40 results from TU331, geographically similar samples collected from adjacent TUs (TU330 and TU332) display similar K-40 concentrations. Additionally, results reported by the offsite lab for the same samples are consistent with the results reported for the rest of Parcel C. The unusually high K-40 value (29.65 pCi/g) measured at sample point 15, appears to be an outlier." 4. Resample due to low variability Bi-214 and extremely low variability K-40, probable sample substitution due to counting one sample 5 days after the rest, and evidence of multiple populations.
Resample due to uncertainty associated with delay in counting samples, evidence of multiple populations, and low variability in Bi-214 and K-40 data.



TU333

TU337

TU338

2	Form notes, "Final Systematic Ac-228 and Bi-214 Box Plots show lower average activity compared with Bias Ac-228 and Bi-214 results."	Slope breaks in Ac-228, Bi-214, K-40 indicate multiple populations. Form notes, "Quantile plots show the median activity for Ac-228 and Bi-214 are higher for Bias samples compared with Final Systematic samples."
2	Very low variability K-40 FSS data. Bias samples had lower variability than FSS samples for Ac-228 and Bi-214, but higher variability than K-40 FSS samples. This suggests that bias samples are a different population than the FSS samples.	Slope breaks in Ac-228, Bi-214, and K-40 plots indicate multiple populations. Form notes, "K-40 final systematic plot is closer to horizontal than the bias plot, indicating less variability in the final systematic data."
2	Very low variability K-40 and Bi-214 FSS data.	Slope breaks in Ac-228, Bi-214, and K-40 plots indicate multiple populations.

2	Form notes for gamma statics, "Measurements are relatively high compared to other trenches in Parcel C, consistent with higher average radionuclide concentrations identified in soil samples. Sixteen (16) of 18 static measurements exceeded the scan investigation level for the instrument. The highest static measurement was for sample 18. No static readings were provided for bias sample locations. Biased samples were selected based on the results of the gamma scan survey conducted the same day the Final Systematic samples were collected. The first round of bias samples was collected a week after the Final Systematic samples. The gamma survey associates elevated readings with samples 19, 20 and 21, however there are no measurements recorded for those locations in the static surveys and samples weren't collected for a week after those measurements were made. Clean-up of two of those locations occurred sometime after that and were resampled 74 days after the biased samples were collected. The gamma scan dataset in the draft SUPR doesn't reflect any resurvey and sample data of the confirmation samples. The draft SUPR does not discuss resampling systematic locations after additional remediation was performed." For gamma scan, the form notes, "Section 3 states the highest scan count rates were associated with samples 19, 20 and 21, however 16 static measurements exceeded the scan investigation level. "
1	Gamma scan and gamma statics were collected prior to FSS sample collection, suggesting potential to bias samples to areas with low readings. Form notes for gamma scan, "Gamma scan results range from 3,640 to 8,420 cpm, exceeding the investigation level of 8,150 cpm at sample location 28." Form notes for gamma statics, "Gamma static results ranged from 3,565 to 7,166 cpm, with the maximum reading at sample location 28." This location had the highest K-40 measurement, but it is unclear if the maximum gamma static measurement is really consistent with the gamma scan maximum.
1	Form notes for gamma statics, "Gamma static results ranged from 3,399 to 9,206 cpm, with the highest reading recorded for sample location 14." Form notes for gamma scan, "The gamma scan results ranged from 3,830 to 10,900 cpm, exceeding the action level of 8,150 cpm at sample location 14." The gamma scan maximum is 1,700 cpm higher than the gamma static maximum, which does not appear to be consistent. However, this point was sampled.

Form notes, "Bi-212 doesn't correlate very well, otherwise onsite and offsite results are generally consistent."		0	
	Form notes for Bi-214 and Ac-228, "Final Systematic samples indicate the potential for at least two different data populations."	0	
	Form notes for Bi-214 and Ac-228, "Final Systematic samples indicate the potential for at least two different data populations."	0	

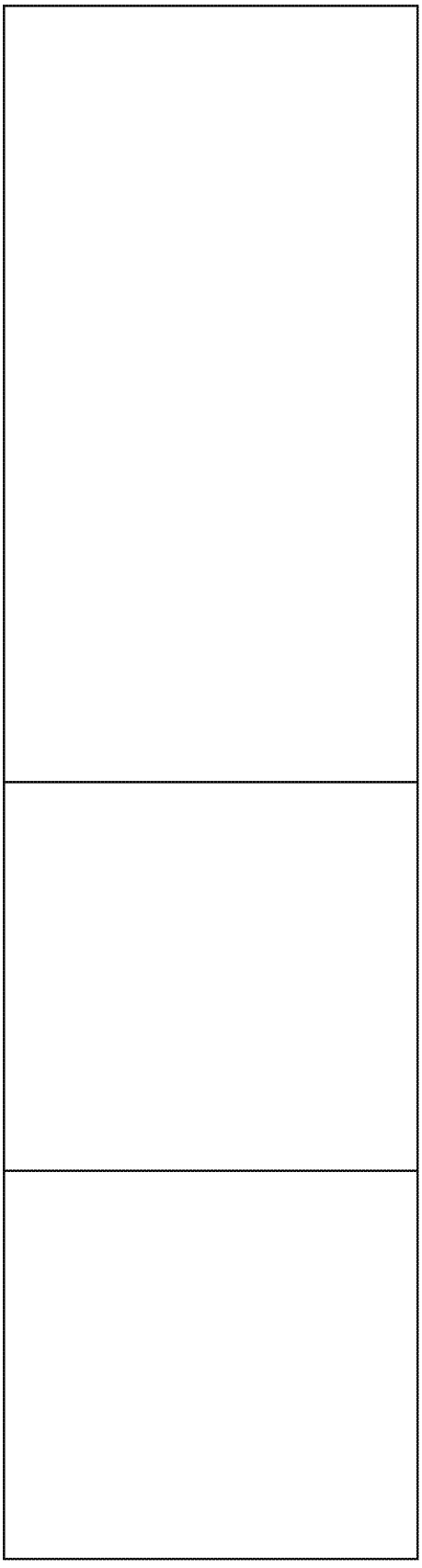
B. Willett	1	FSS samples collected over 3 days. Form states, "FSS samples were collected on 08/02/2013. Additional samples were collected on 08/09/2013 and 10/24/2013." It appears these were bias samples due to gamma scan exceedences. However, there should have been a 2nd set of 18 FSS samples collected, which does not appear to have been done.	1
C. Bradfield	1	Very low variability K-40 data appears to be inconsistent with HPS data. This was a sign of potential falsification in 2012.	1
B. Willett	1	Samples were not counted within 2 days of collection (10/17/13) and were counted on three different days, indicating the potential for substitution. Form notes, "Samples were counted Friday 10/18/2013, Monday 10/21/2013, and Tuesday 10/22/2013."	1

1. No date or time recorded for static survey in SUPR and no sampler/surveyor name in SUPR. 2. Second set of FSS samples (required after remediation due to elevated gamma scan and bias samples) was not collected.
FSS samples collected after gamma scan and gamma static surveys.
No date or time recorded for static survey in SUPR and no sampler/surveyor name in SUPR.

1. Resample due to uncertainty and failure to collected a full set of 18 FSS samples after remediation, lack of required gamma static measurements, and evidence of multiple populations.
2. One bias sample analyzed by off-site lab after 21-day ingrowth exceeded cleanup criterion for Ra-226, but was not excavated due to application of the background area for NORM.
3. K-S test failed for multiple radionuclides. Form observes, " TU333 had a significantly high mean for Ac-228 compared to the rest of parcel C and had a p-value of 1.69e-14. TU333 had a significantly high mean for Bi-212 compared to the rest of parcel C and had a p-value of 4.25e-8. TU333 had a significantly high mean for Bi-214 compared to the rest of parcel C and had a p-value of 1.07e-12. TU333 had a significantly high mean for Pb-212 compared to the rest of parcel C and had a p-value of 1.31e-14. TU333 had a significantly high mean for Pb-214 compared to the rest of parcel C and had a p-value of 2.68e-14. TU333 had a significantly high mean for Ra-226 compared to the rest of parcel C and had a p-value of 6.36e-8."

1. Resample due to uncertainty and potential that FSS samples were mostly biased to areas with low readings, low variability K-40 data, K-S test failures, and evidence of multiple populations.
2. Cs-137 detected in manhole sediment at 0.1999 pCi/g. Ra-226 detected in one pipe segment at 5.940 pCi/g. One pipe section swipe sample had "elevated fixed beta/gamma contamination levels, recorded at a maximum of 1,183 disintegrations per minute per 100 square centimeters. As a result, the manhole and pipe section were disposed of as low-level radioactive waste." Biased samples were collected from the bottom of the trench in response to these detections.
3. Form notes in conclusions, "TU337 consists of soils with multiple radionuclide distributions, with Ac-228 providing graphical evidence of at least two distributions. This is consistent with observations from adjacent trenches in Parcel C and confirms the presence of multiple soil types being used as fill in this area of HPNS. " However, there is no supporting evidence that this is the case.

1. Resample (and scan) due to failure to remediate point 14 where off-site lab sample had higher Ra-226/Bi-214 results than the onsite lab (failure to meet ROD requirements), very low variability Bi-214 and K-40 data, analysis of samples on 3 different days allowing for potential substitution, and evidence of multiple populations.
2. There is no evidence that remediation of elevated sample point 14 occurred or that a second set of FSS samples were collected following remediation of this point. Form notes, "Sample 14 exceeded the Ra-226 release criterion with a reported concentration of 1.490 pCi/g. Sample 14 was allowed to reach secular equilibrium between Ra-226 and Bi-214 and was recounted in an offsite laboratory. The reported concentration of Ra-226 following ingrowth was 1.632 pCi/g, again exceeding the release criterion." In the conclusions, the Navy wrote this off as a small area of fill with elevated activity, but this does not meet the ROD requirements.



TU339

2	Low variability Bi-214 data.	Slope breaks in Ac-228, Bi-214, and K-40 data plots, indicating multiple populations. Form notes, "Ac-228 and Bi-214 Quantile plots have bends, indicating the potential for multiple distributions."

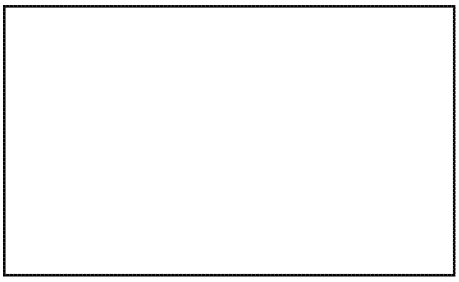
1	

	Form notes for Bi-214 and Ac-228, "Final Systematic samples indicate the potential for at least two different data populations."	0	

G. Winder	0		1

1. Static Survey date and time not included in SUPR.
2. 15 feet of pipe not removed.

1. Re-excavate and resample, remove the 15 feet of pipe that was not excavated and sample the trench area where this pipe segment is removed. Resampling needed due to low variability Bi-214 data and evidence of multiple populations.
2. Form notes, "15 linear feet of pipe associated with trench segment 12-C31-00-2G was not removed in order to facilitate Parcel C swale construction activities," which appears to not be in compliance with the ROD.



Fill Units (Overburden Unit or Excavated Soil Unit)	Associated Trench Unit	Navy Recommends confirmation sampling of the FU (0=no; 2=yes) 1 = reanalyze archived sample	Navy Recommends TU Confirmation Sampling
ES300	TU197	2	2
ES301		2	
ES302		2	
ES303	TU196	2	2
ES307	TU199	0	0
ES308	TU208	2	0
ES309	TU209	0	0
ES311	TU207	2	0
ES312	TU206	2	0
ES314	TU199	2	0
ES317	TU205	2	0
ES318	TU196	2	2
ES321	TU209	2	0
ES322	TU196	2	2
ES324	TU209	2	0
ES325	TU198	2	1
ES327	TU198	0	1
ES329	TU198	2	1
ES332	TU219	0	0
ES333	TU219	2	0
ES334	TU200	0	0
ES336	TU212	2	0
ES337	TU198	2	1
ES338	TU198	2	1
ES339	TU212	0	0
ES340		2	
ES341		2	
ES342		2	
ES343	TU207	0	0
ES375	TU194	2	1
ES378	TU191	2	1
ES380	TU191	2	1
ES381	TU191	2	1
ES382	TU191	0	1
ES383	TU194	0	1
ES385	TU195	0	2
ES390	TU195	0	2
ES392	TU195	0	2
ES421	TU200	2	0
ES436		2	

Reg Agencies Recommend TU Confirmation Sampling	Confirmation Sampling Recommended
	2
	2
	2
	2
2	2
2	2
2	2
2	2
2	2
2	2
2	2
	2
2	2
	2
2	2
2	2
2	2
2	2
2	2
2	2
2	2
2	2
2	2
2	2
0	0
	2
	2
	2
2	2
2	2
2	2
2	2
2	2
2	2
2	2
	2
	2
	2
2	2
	2

Navy recommends resampling FU that went into this TU, therefore, all FUs that went into this TU must be resampled. (OB072, OB196)

Navy recommends reanalyzing archived sample only
Navy recommends reanalyzing archived sample only
Navy recommends reanalyzing archived sample only
Navy recommends reanalyzing archived sample only
Navy recommends reanalyzing archived sample only
Navy recommends reanalyzing archived sample only

Comments

S0009/no

S0001

120 fill units and 69 TUs

TU244 had imported fill only. No ES
TU325 had imported fill only. No ES
TU327 had imported fill only. No ES
S0001 - soil was excavated but no fill was used to replace it

ES437		2	
ES438		2	
ES439	TU200	2	0
ES440	TU203	0	2
ES442		2	
ES457	TU203	2	2
ES459		2	
ES462	TU206	0	0
ES465	TU206	0	0
ES467	TU205	0	0
ES468	TU205	2	0
ES469	TU208	2	0
ES491	TU210	2	1
ES492	TU221	0	0
ES500	TU208	2	0
ES501	TU207	2	0
ES502		2	
ES508		2	
ES510		2	
ES511		2	
ES513		2	
ES515		2	
ES516		2	
ES517		2	
ES518		2	
ES597		2	
ES598		2	
ES612		2	
ES613		2	
ES614		2	
ES627		2	
ES628		2	
ES629		2	
ES630		2	
ES632		2	
ES635		2	
ES636		2	
ES694		2	
ES695		2	
ES749		2	
ES752		2	
ES770		2	
ES773		2	
ES774		2	
ES787		2	
ES788	TU317	0	0
ES795		2	

	2
	2
2	2
	2
	2
	2
	2
2	2
2	2
2	2
2	2
2	2
2	2
2	2
2	2
2	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
2	2
	2

Navy recommends reanalyzing archived sample only
TU210 form indicates ES492 used as backfill in other trenches

S0002 - no soil excavated so no fill required
TU192 - Unknown fill units

ES798		2	
ES799		2	
ES801	TU317	0	0
ES802	TU321	2	0
ES803		2	
ES804	TU329	0	2
ES805	TU322	0	0
ES806	TU321	0	0
ES807		2	
ES816		2	
ES819		2	
ES820		2	
ES821		2	
ES822	TU329	2	2
ES823		2	
ES824		2	
ES825	TU329	2	2
ES826	TU329	2	2
ES827		2	
ES828		2	
ES830		2	
ES831	TU332	2	0
ES832	TU332	0	0
ES833	TU332	2	0
ES836		2	
ES838	TU334	0	2
ES840	TU335	0	2
ES852	TU338	2	0
ES853	TU338	0	0
ES855		2	
ES856	TU338	2	0
Total Units			
S0001		0	
S0002		0	
S0003		2	
S0004		2	
S0005		2	
S0006		2	
S0007		2	
S0008		2	
S0009		0	
S0010		2	
S0011		2	

	2
	2
2	2
2	2
	2
	2
2	2
2	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
2	2
2	2
2	2
	2
	2
	2
2	2
2	2
	2
2	2
	0
	0
	2
	2
	2
	2
	2
	2
	0
	2
	2

Excavation disposed of and not reused
No soil was excavated, therefore not used as fill elsewhere

Excavation disposed of and not reused

Summary of EPA/DTSC/CDPH reviews

Total units recommended for resampling by Navy and EPA/DTSC/CDPH

# of units	% of units	
65	94%	Trench Units, excluding North Pier
116	97%	Fill Units
9	82%	North Pier Survey Units
190	91%	Total

Navy and EPA reviews of Parcel C Trench Units

Navy reviewed all Trench Units to look for signs of potential falsification		
69	100%	*Total trench units, excluding North Pier*
28	41%	Navy recommended confirmation sampling due to signs of potential falsification
4	6%	Navy recommended reanalysis of archived samples
37	54%	Navy recommended NFA = No further action due to signs of falsification,
EPA reviewed the Trench Units recommended for NFA		
4	6%	EPA score 0 = No specific findings of particular concern
0	0%	EPA Score 1 = Need further review
33	48%	EPA Score 2 = Need resampling before determination that the record supports ROD requirements met
Total Navy and EPA recommend for resampling Trench Units or reanalysis of archived samples		
65	94%	

Navy and DTSC reviews of Parcel C Fill Units

Navy reviewed all Fill Units to look for signs of potential falsification		
120	100%	*Total fill units*
94	78%	Navy recommended confirmation sampling due to signs of potential falsification
0	0%	Navy recommended reanalysis of archived samples
26	22%	Navy recommended NFA = No further action due to signs of falsification
DTSC reviewed the Fill Units recommended for NFA		
4	3%	DTSC score 0 = No specific findings of particular concern
0	0%	DTSC Score 1 = Need further review
22	18%	DTSC Score 2 = Need resampling before determination that the record supports ROD requirements met
Total Navy and DTSC recommend for resampling Trench Units or reanalysis of archived samples		
116	97%	

Navy and CDPH reviews of North Pier Units

Navy reviewed all North Pier Survey Units to look for signs of potential falsification		
11	100%	*Total fill units*
8	73%	Navy recommended confirmation sampling due to signs of potential falsification
0	0%	Navy recommended reanalysis of archived samples
3	27%	Navy recommended NFA = No further action due to signs of falsification
DTSC reviewed the Fill Units recommended for NFA		
2	18%	CDPH score 0 = No specific findings of particular concern
0	0%	CDPH Score 1 = Need further review
1	9%	CDPH Score 2 = Need resampling before determination that the record supports ROD requirements met
Total Navy and DTSC recommend for resampling Trench Units or reanalysis of archived samples		
9	82%	

Summary of EPA Reviews of Trench Units from Spreadsheet #1	
Trench Unit	EPA Score
TU193	2
TU199	2
TU200	2
TU205	2
TU206	2
TU207	2
TU208	2
TU209	2
TU211	2
TU212	0
TU219	2
TU220	2
TU221	2
TU226	2
TU227	2
TU231	2
TU232	2
TU233	2
TU236	2
TU244	0
TU247	2
TU302	2
TU315	2
TU317	2
TU320	2
TU321	2
TU322	2
TU324	2
TU325	0
TU327	0
TU328	2
TU331	2
TU332	2
TU333	2
TU337	2
TU338	2
TU339	2